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THE IMPACT OF AUTOMATION ON HUMAN BIASES AND INTELLIGENCE

Dr. Itiel Dror

University College London (UCL)

i.dror@ucl.ac.uk

www.cci-hq.com

Transferring academic knowledge
of the brain into the real world

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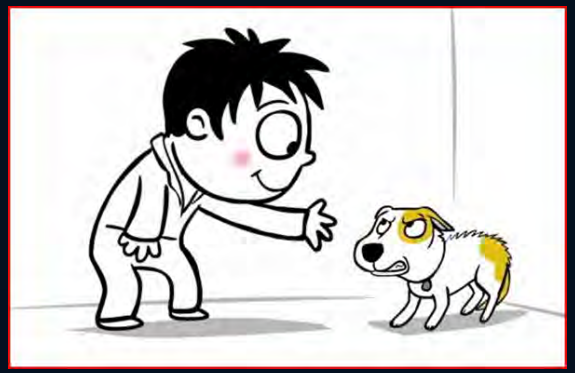
THE IMPACT OF AUTOMATION ON HUMAN BIASES AND INTELLIGENCE

good and bad…

- A huge topic!
- Much to cover
- Some of it is ‘controversial’ (e.g., bias, intelligence, performance, errors)
- Today we take a **BIG** first step in this long journey
- Going to challenge you



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BIGGER QUESTION…

THE IMPACT OF AUTOMATION ON HUMAN BIASES AND INTELLIGENCE

good and bad…

Automation?

good

When?

Why?

How?

bad

dge

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BIGGER QUESTION…

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good and bad…

Automation?

good

When?

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How?

bad

WHY SMART PEOPLE DO STUPID THINGS

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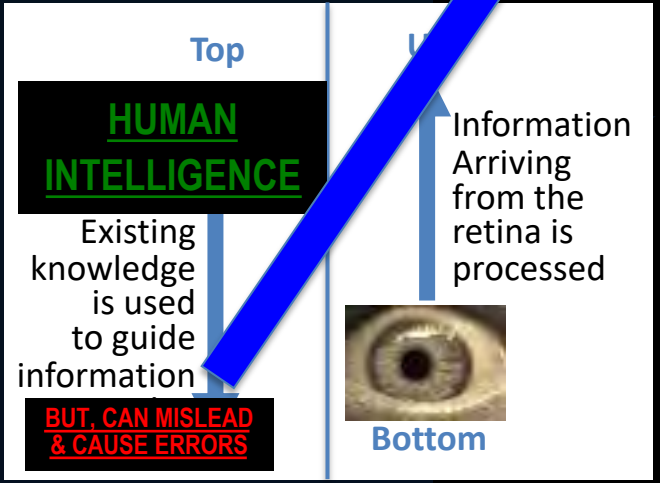
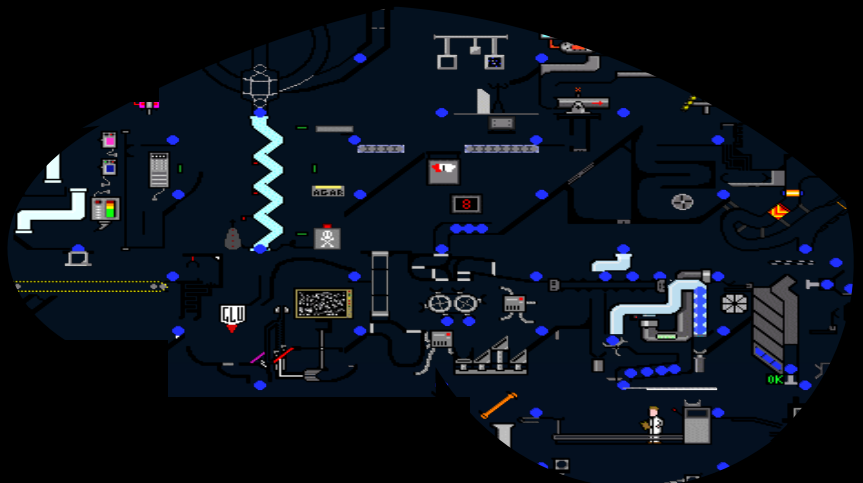
good and bad…

- Information gets into the brain the 'input', the 'data' → "Bottom-up information"

VS.

- What is already 'in the brain' (e.g., experiences, knowledge) → "Top-down information"
- These 'top-down' & 'bottom-up' interact.





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good and bad…

Neuronal plasticity:

→ Adaptations

Human Factors

A. How does the brain work?

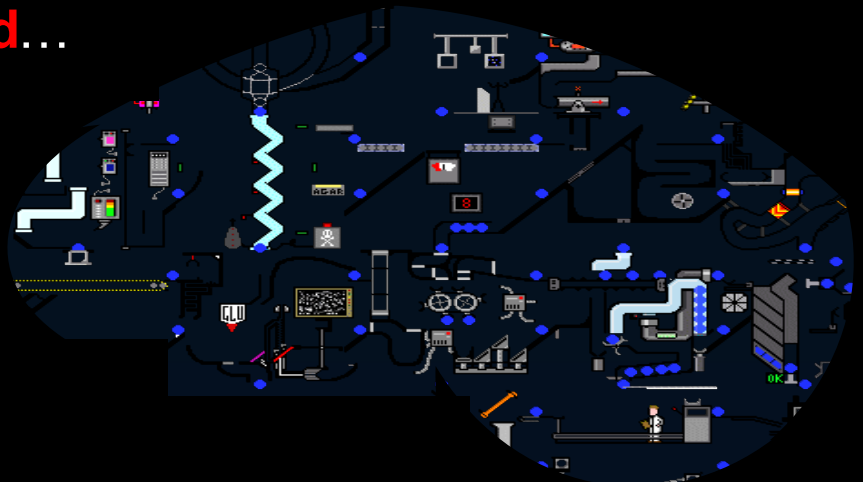
And,

B. How does automation impact it?

→Automation… impacting our intelligence and biases…

→For good, and for bad…

The mind is NOT a camera



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Let's see, and understand, an example:

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"Automation"…?

Dividing the work, including cognitive work ('cognitive technology')

→ **Distributed Cognition**

Different levels:

1. 'Off loading'
2. Partnership, collaborating
3. Human is 'subservient'

From 'helping', to 'working with us',
to 'taking over'

good and bad…

E.g., Driving, aviation, railway, healthcare, etc., etc.

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- Creates cognitive overload
  - Availability
  - Speed
  - Keeping up
  - Pay attention
  - Expected to increase productivity
  - Etc., etc. etc….

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'good and bad'

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- **Creates cognitive overload**
- **Reduces cognitive load**
  1. 'Off loading'
  2. Partnership, collaborating
  3. Human is 'subservient'

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'good and bad' – But it gets more complicated…!

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- Creates cognitive overload
- Reduces cognitive load

1. 'Off loading'
2. Partnership, collaborating
3. Human is 'subservient'

???

→

BUT ALSO…:

→

→

→

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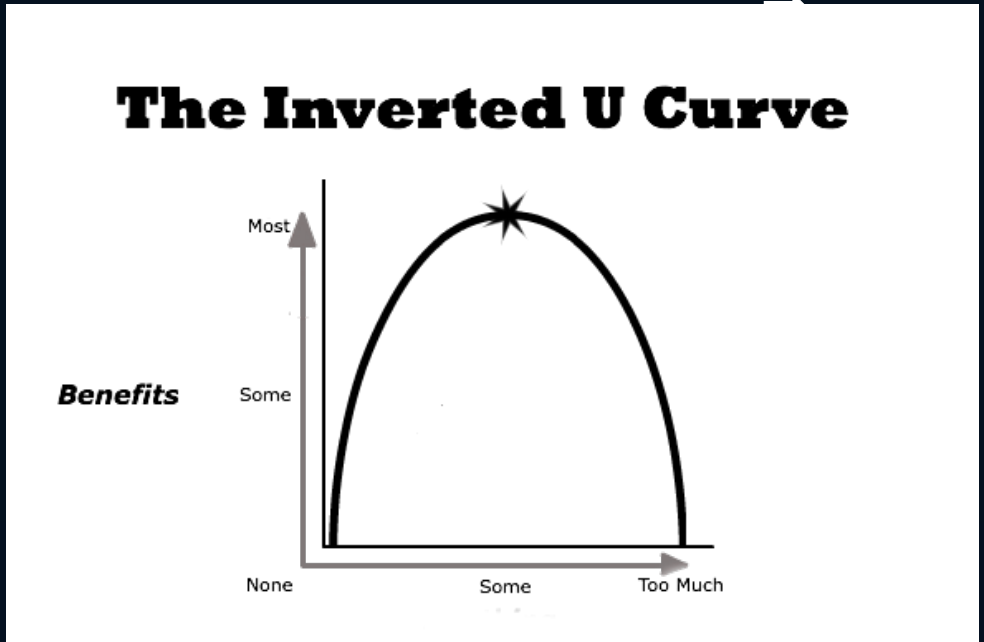
THE IMPACT OF AUTO E

The New York Times

50 Killed as Plane Hits House Near Buffalo

- Reduces cognitive load

Not ‘theoretical’:
-Continental flight 3407
-Automation intended to improve safety and performance…
-See NTSB review and findings as per what automation actually achieved.



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Neuroplasticity, top-down cognitive-brain processes

- Dynamic
- Responsive
- Flexible
- Interactive

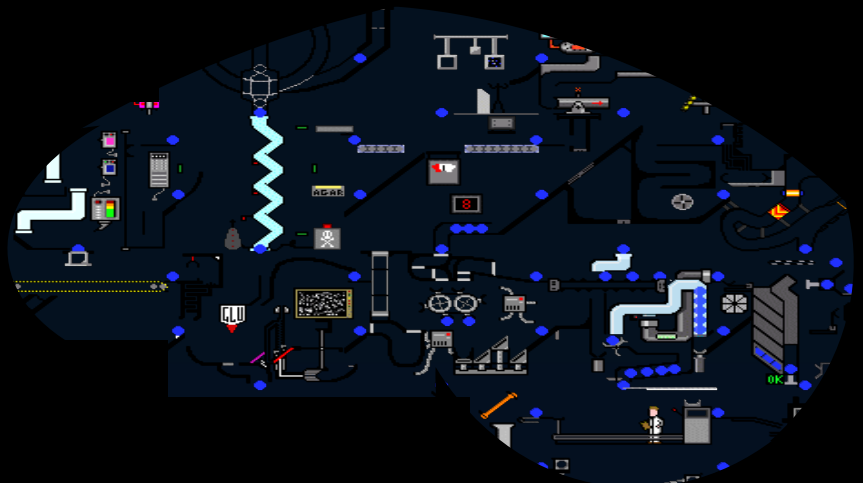
→ "**Use it, or lose it**"

Automation:

➔ **We think/do less…**

➔ **Our abilities go down…**

Let's see some examples...:



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- Literacy….
  → Reduced our human memory capacity
- Photography….
  → Think less
- Driving….
  → ‘Don’t know much...’ also staying vigilant
- Doing statistics….
  → Not see the data, lose sight of what is going on

In other words automation has ‘spoiled’ us,

making the human brain ‘lazy’

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Automation has ‘spoiled’ us, making the human brain ‘lazy’,
Combined with the brain’s neuroplasticity (‘use it or lose it’), causing:

- Our abilities to do things decrease
- Our thinking abilities decease
- Our perceptions decrease
- Our flexibility and responsiveness decease.

We need to think of the risks & obstacles, as we use & rely more on automation.

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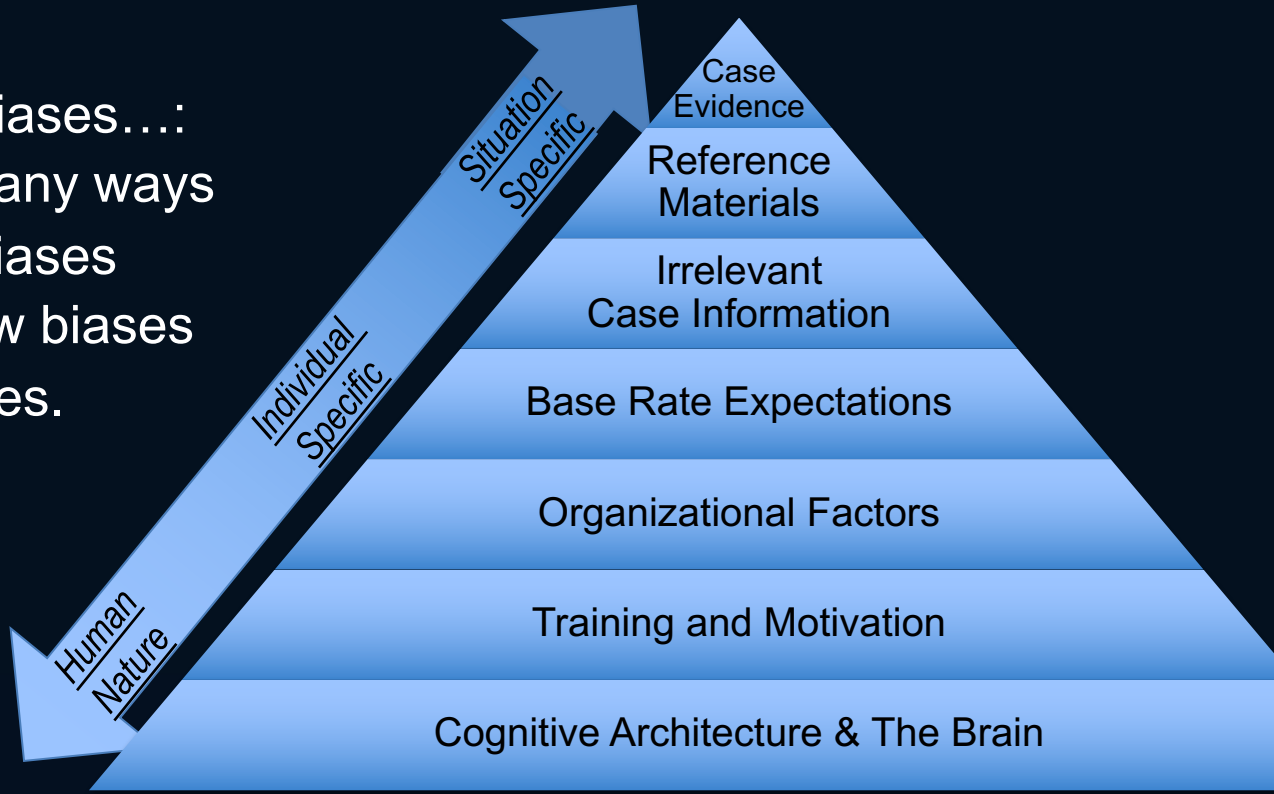
good and bad…

Same goes for human biases…:

- Reduces biases in many ways
- But, also increases biases
- And even creates new biases
- As well as hides biases.



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Questions…???

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